

In Situ Measurements of Ice Water Content in Thin Cirrus

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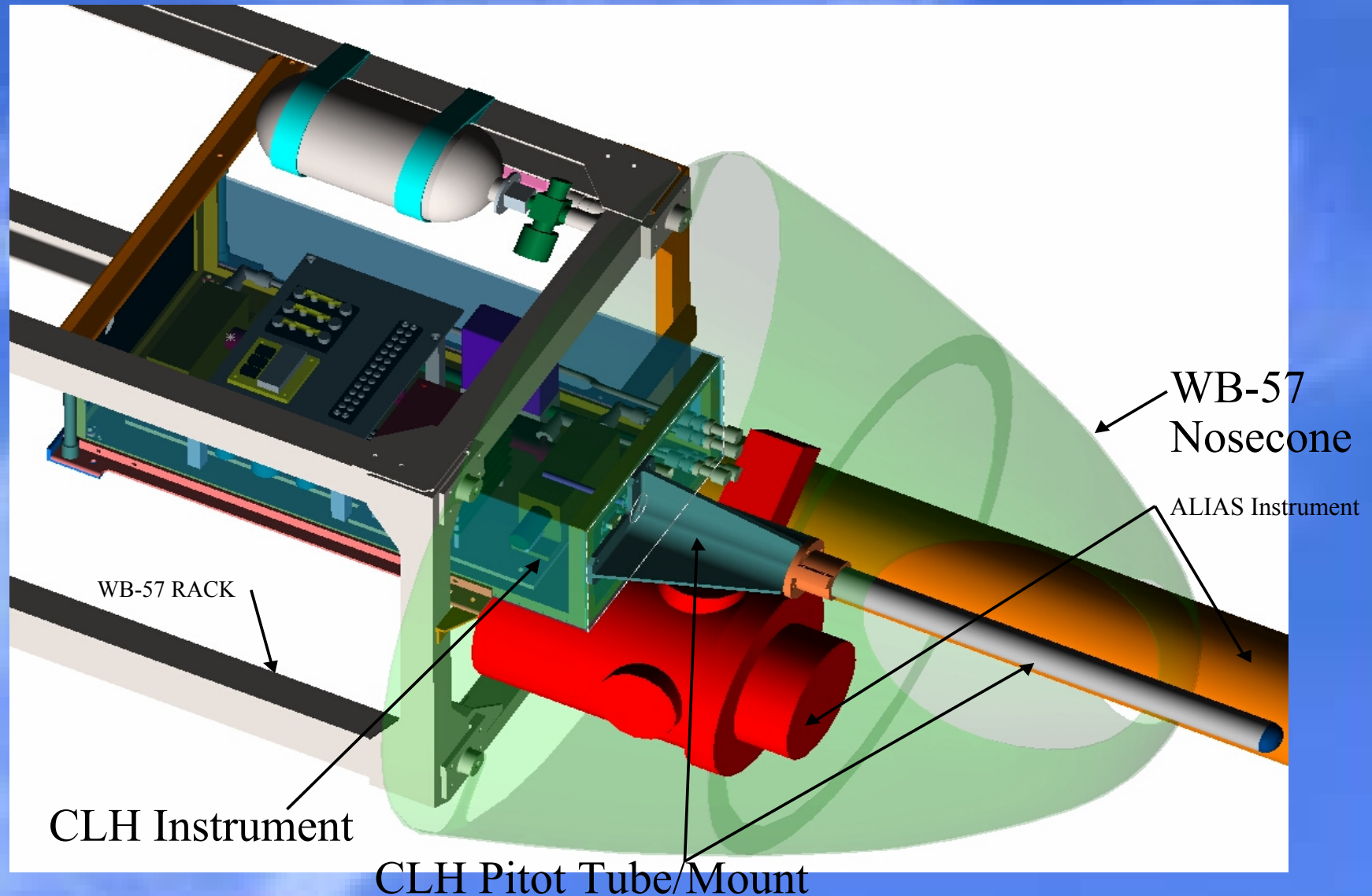
Importance of Thin Cirrus

- Pervasive nature of subvisual cirrus in tropics
- Even very thin cirrus are radiatively important
- Contrails are becoming more significant contributors to cloud cover

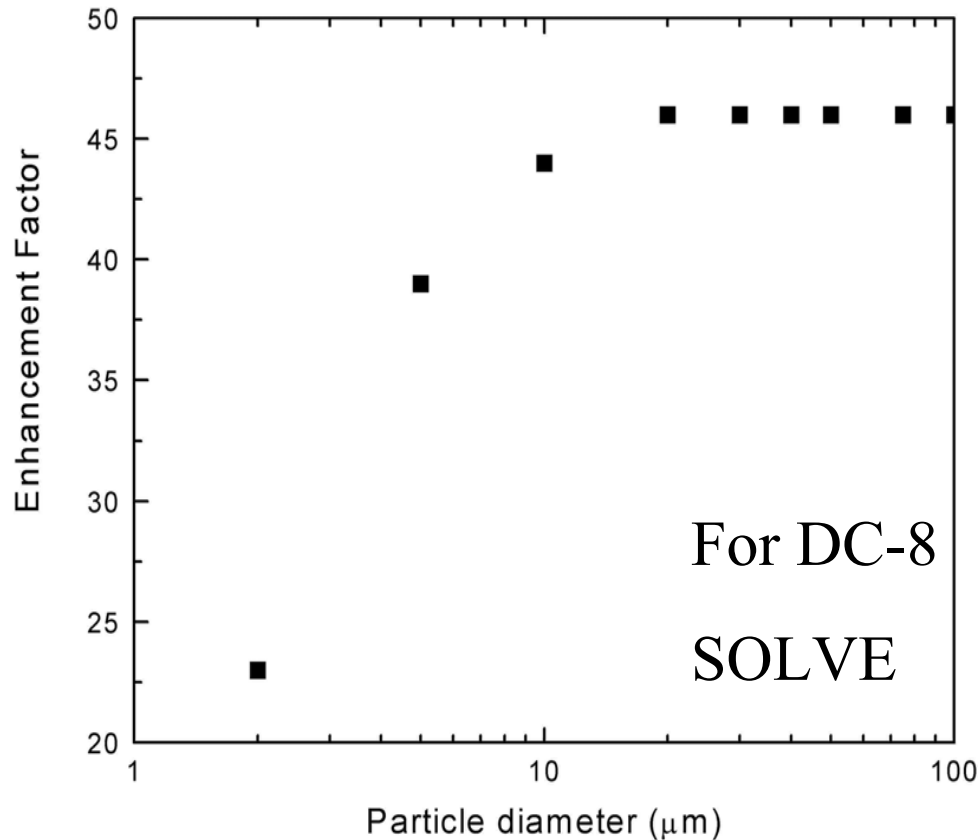
Strategy to Measure IWC of Thin Cirrus

- Need to be able to measure ice water content $< 1 \text{ mg m}^{-3}$
- Make use of inertial enhancement of anisokinetic inlet
- TDL spectroscopy for fast response

Closed-path Laser Hygrometer



Inertial Enhancement



**EF estimated
from:**

Inlet temperature

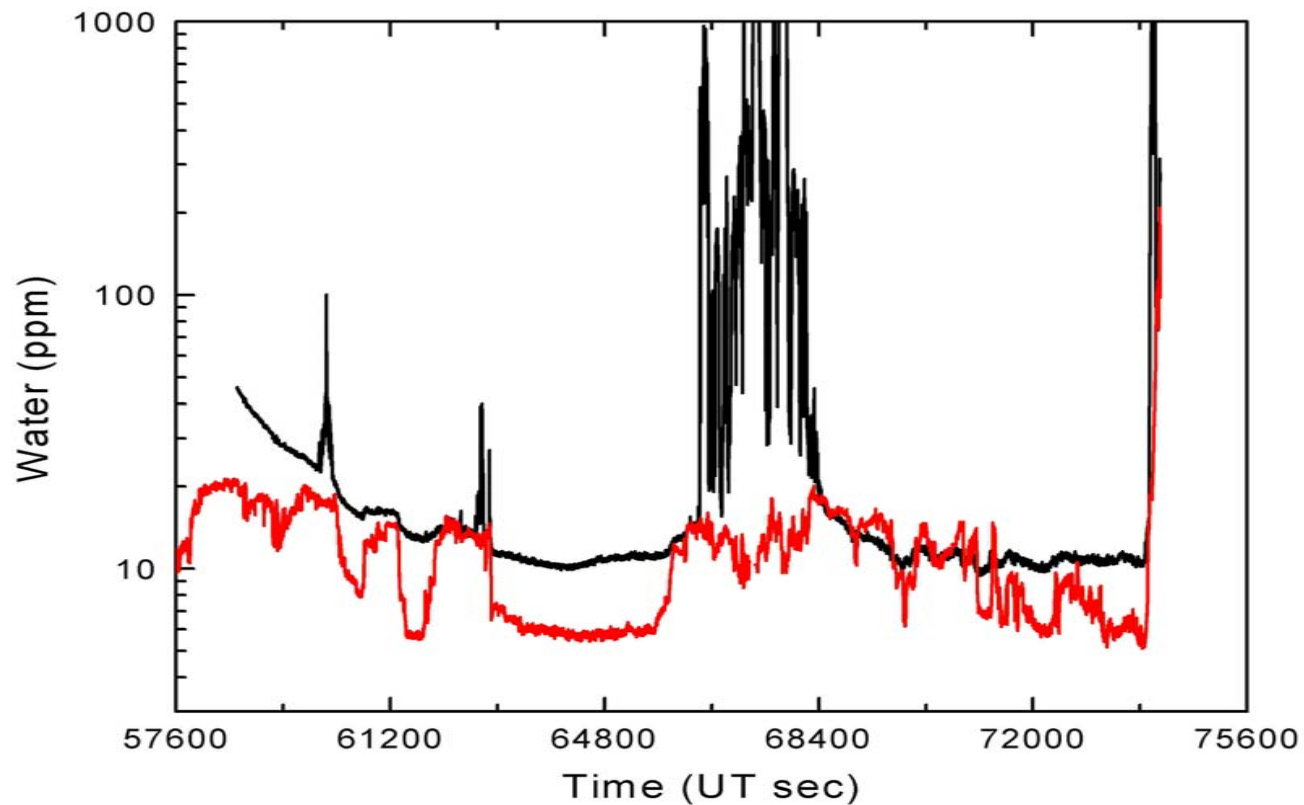
Static pressure

True Air Speed

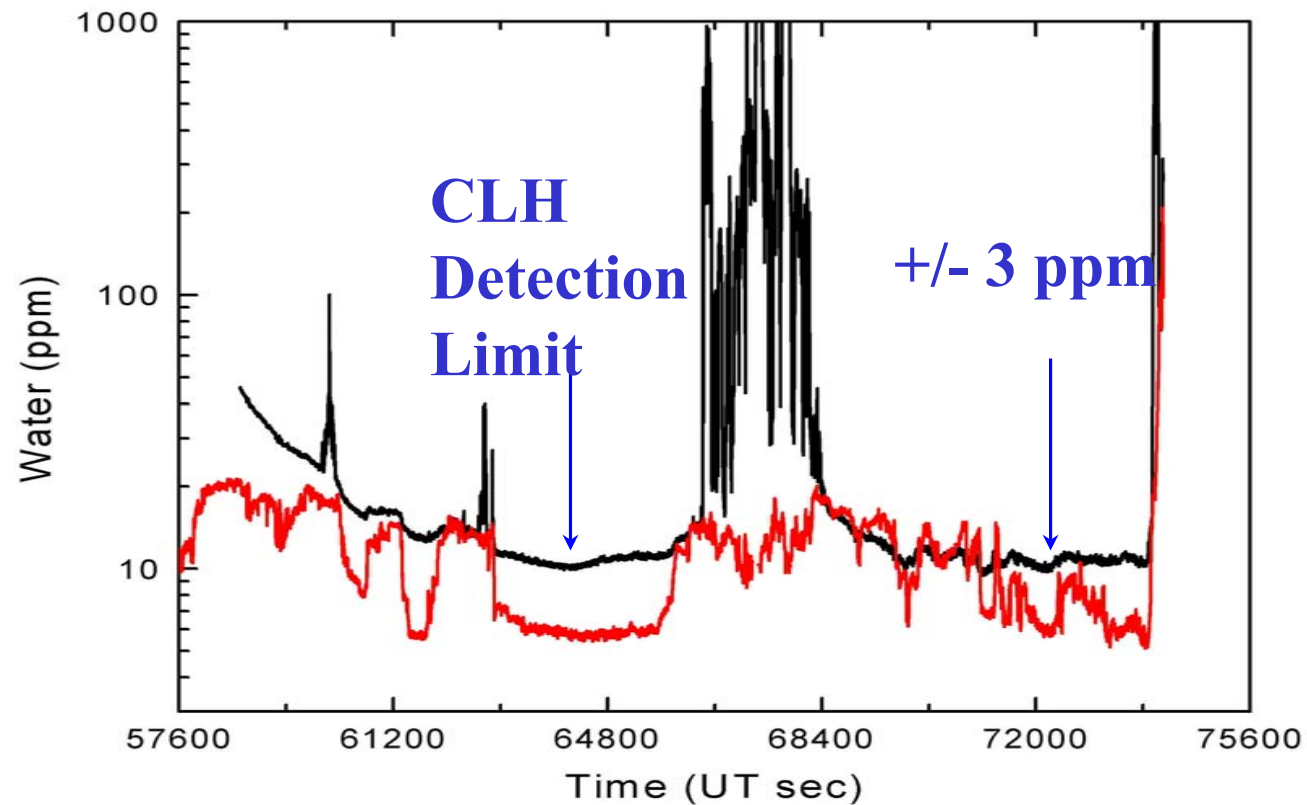
CLH flow rate

⇒ Maximum EF

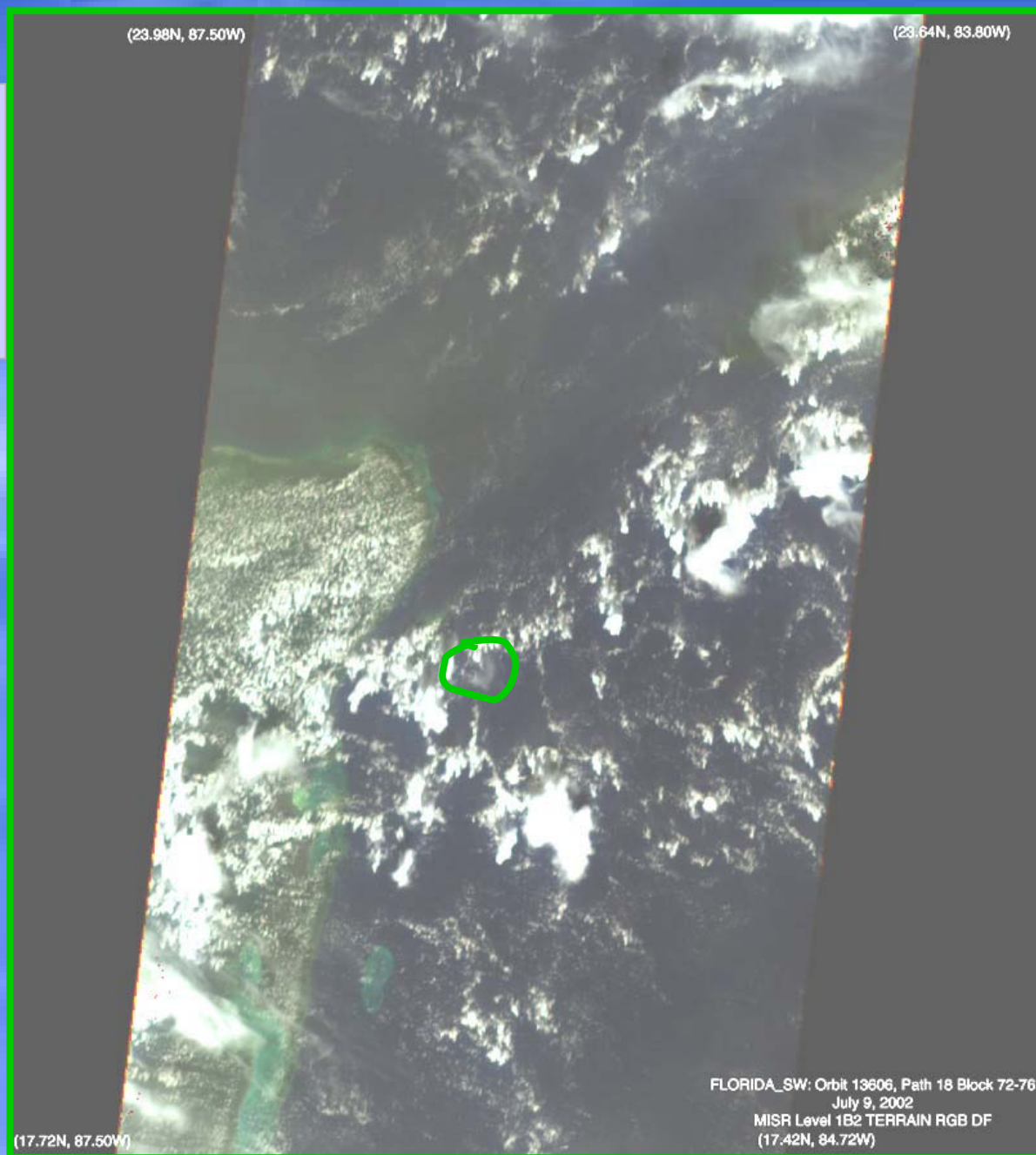
Example of Raw Data



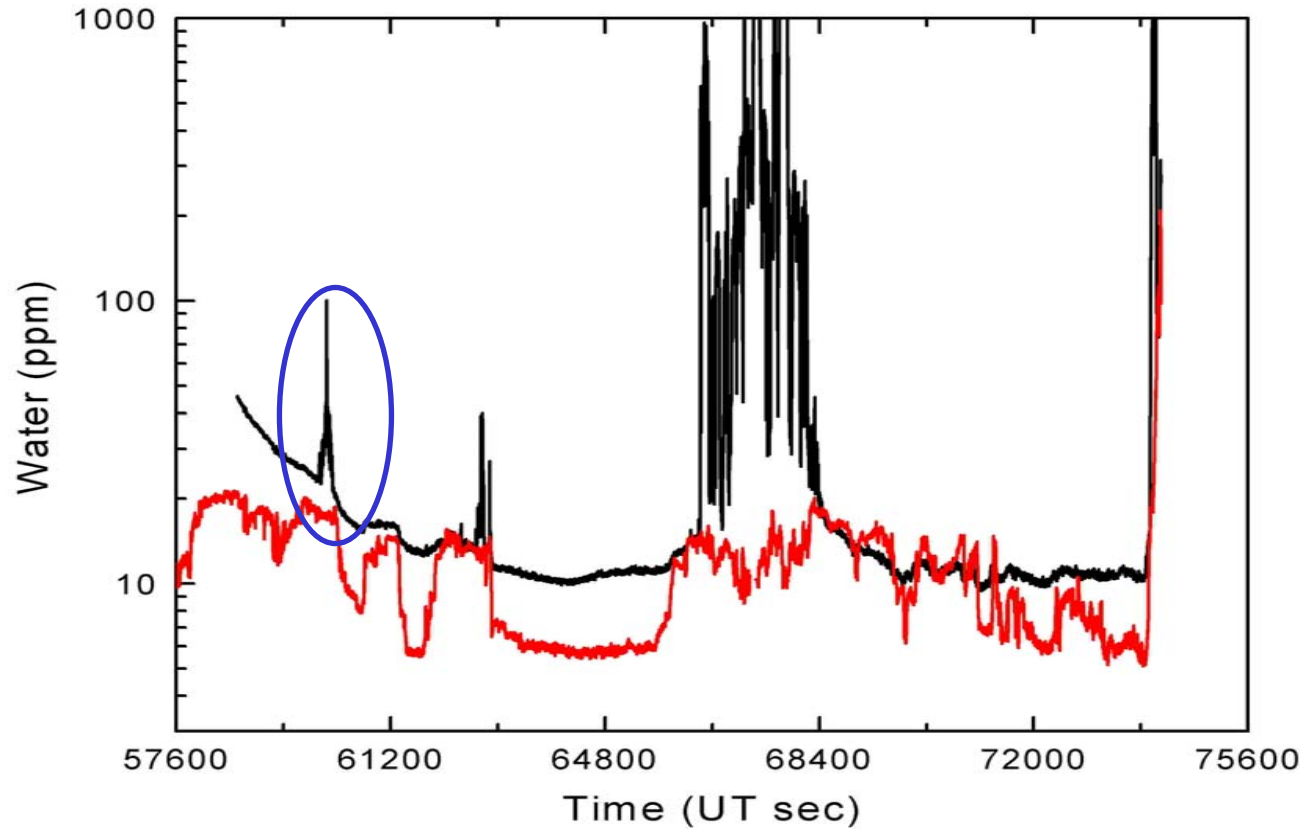
Example of Raw Data



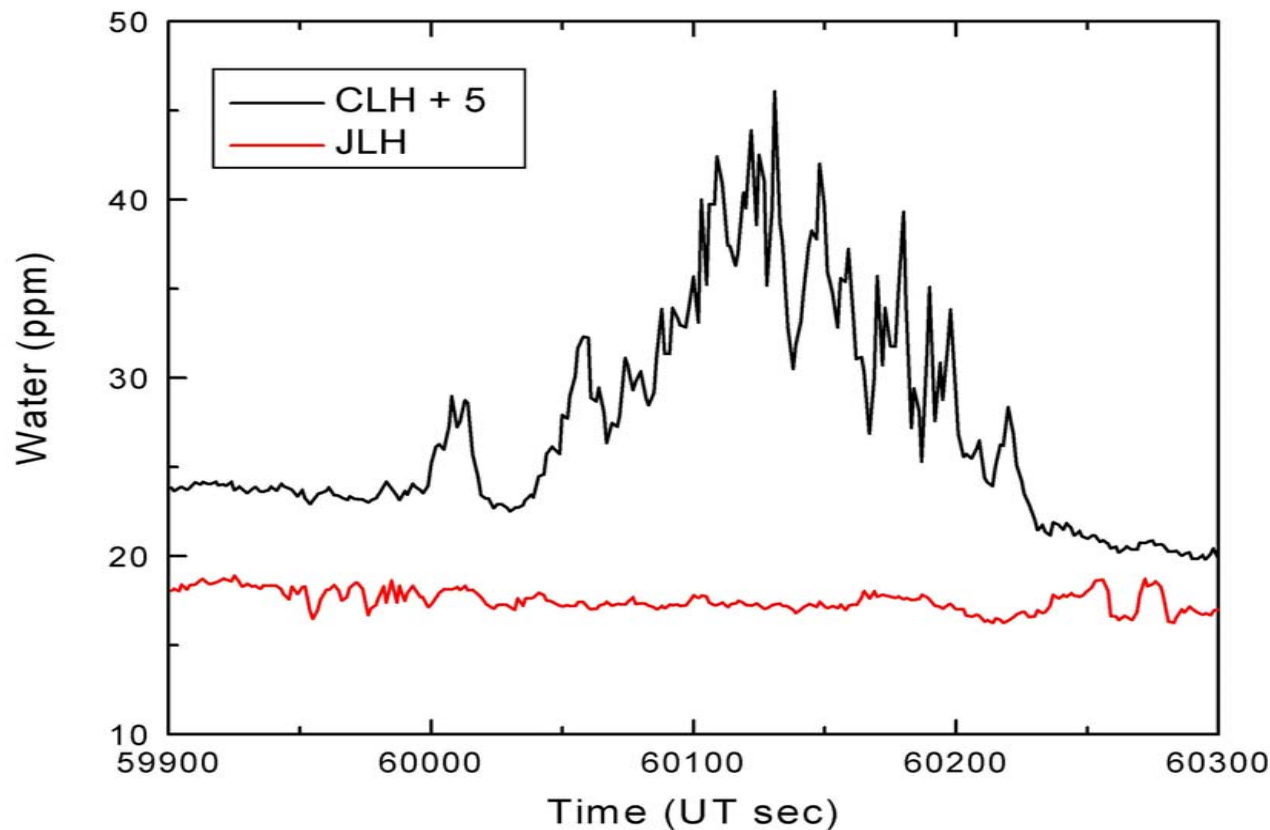
MISR DF
70° Forward
View
July 09, 2002



MISR overpass - 20020709

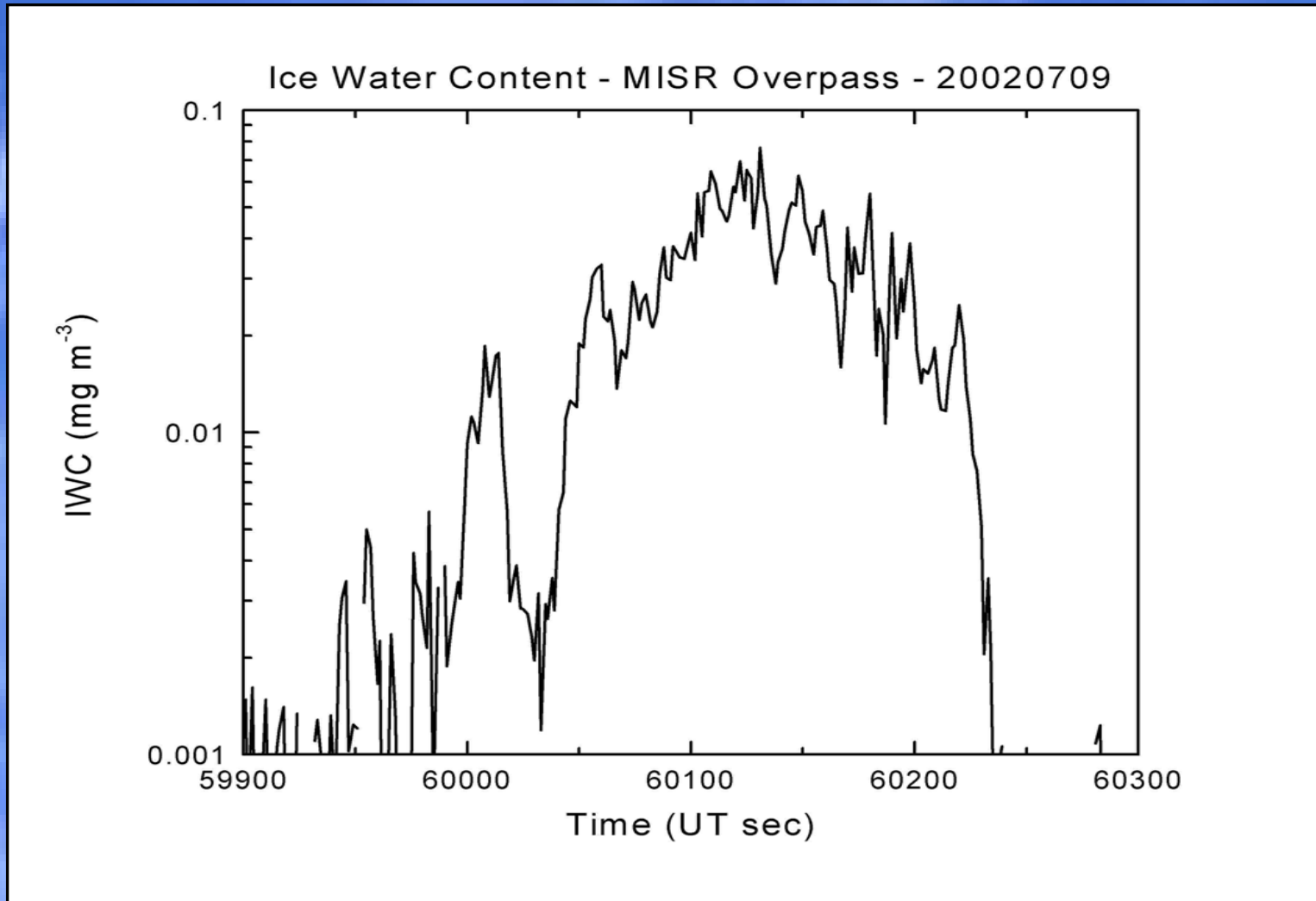


MISR overpass - 20020709

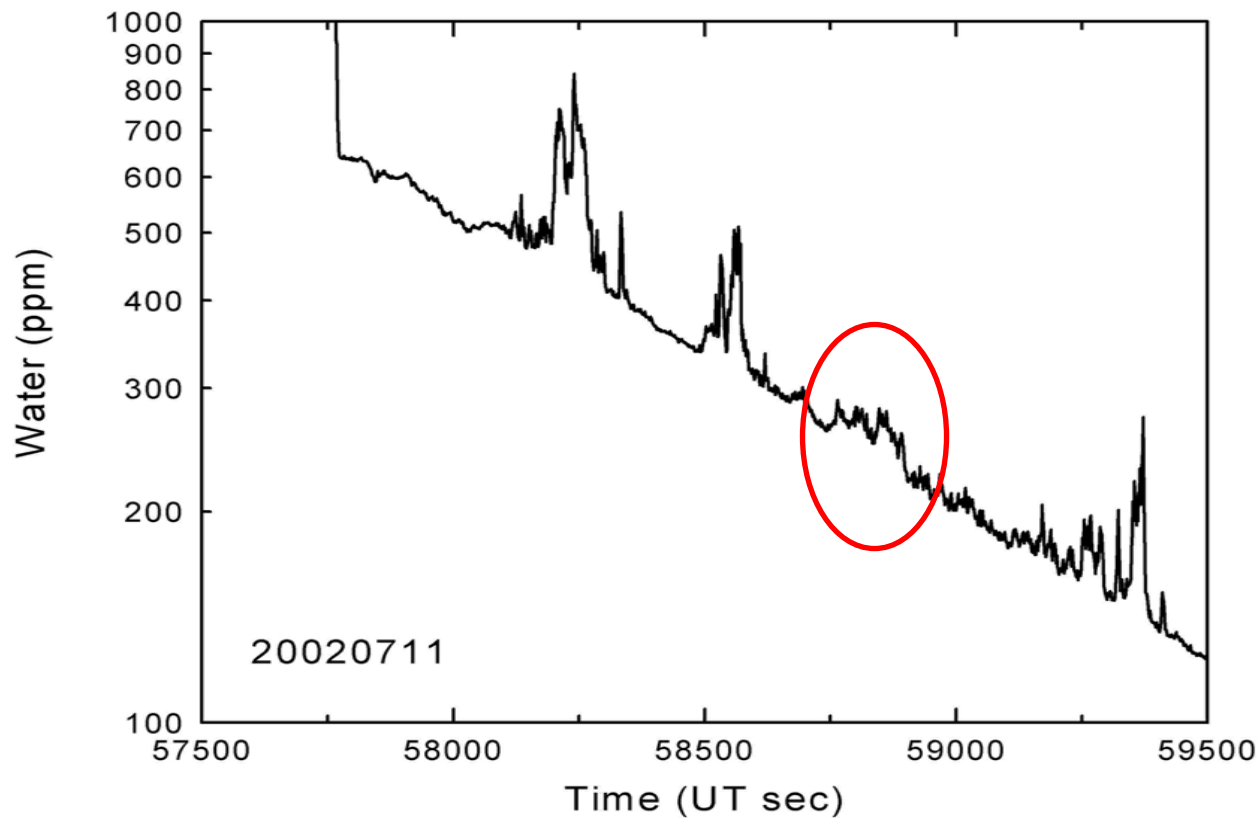


S/N ~ 50:1

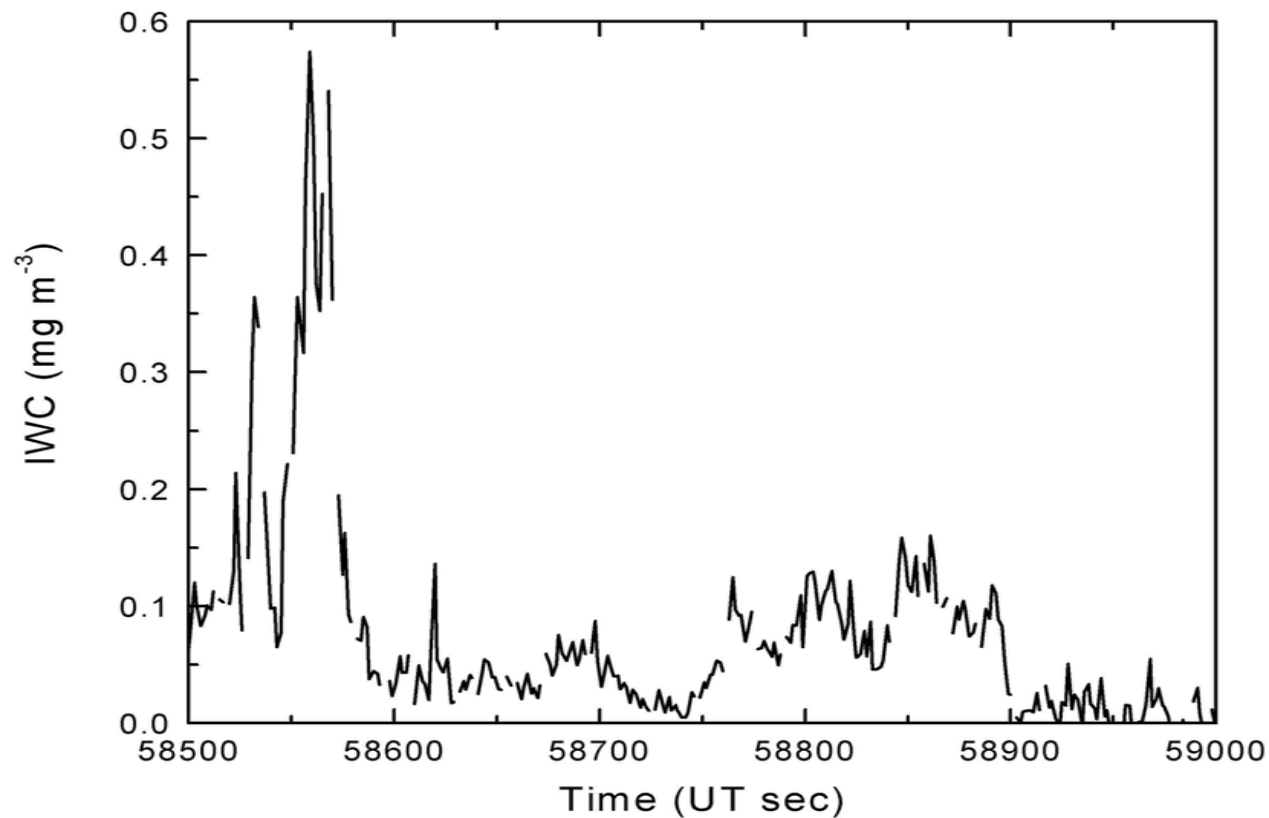
MISR overpass - 20020709



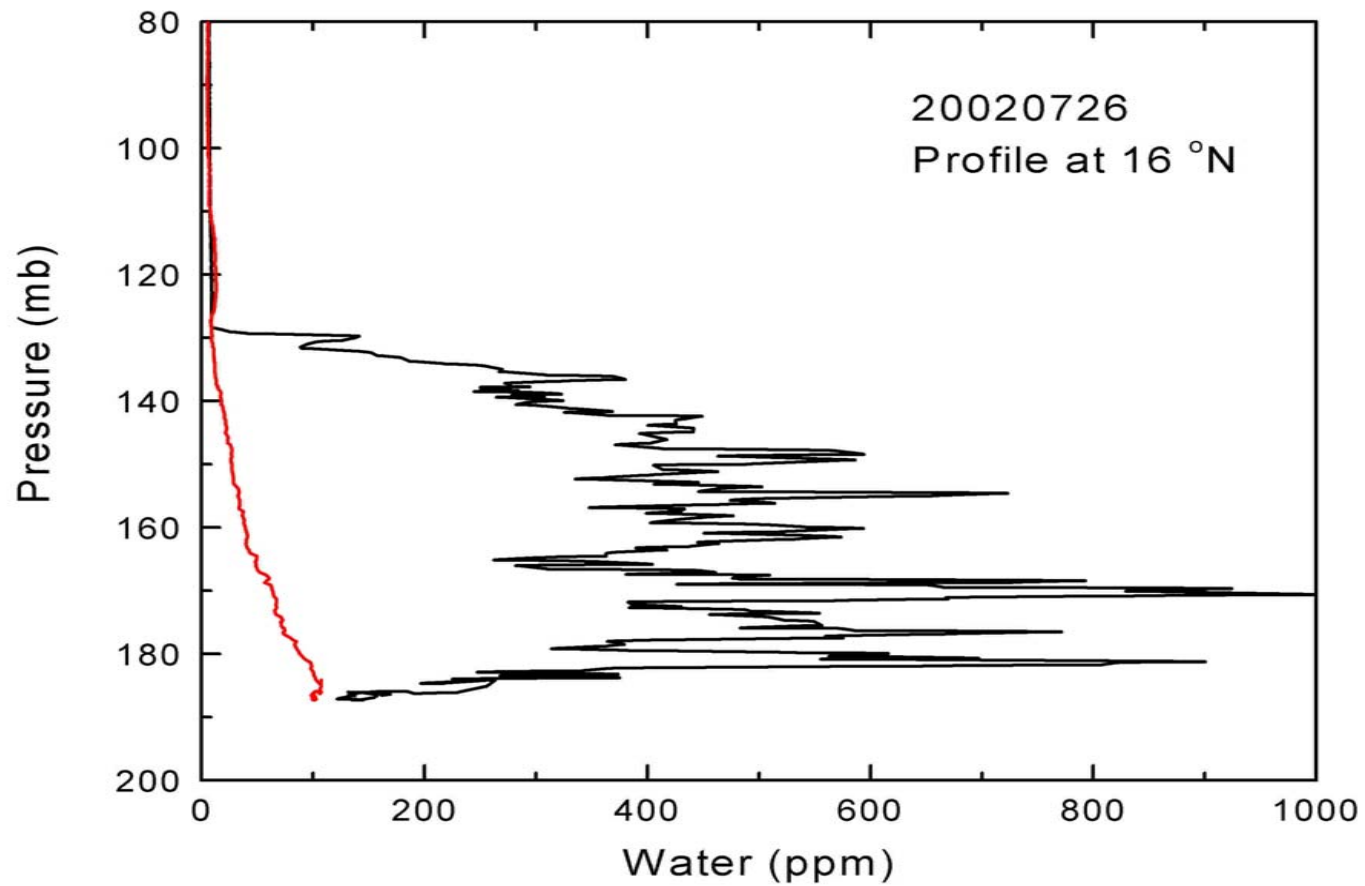
MISR overpass - 20020711



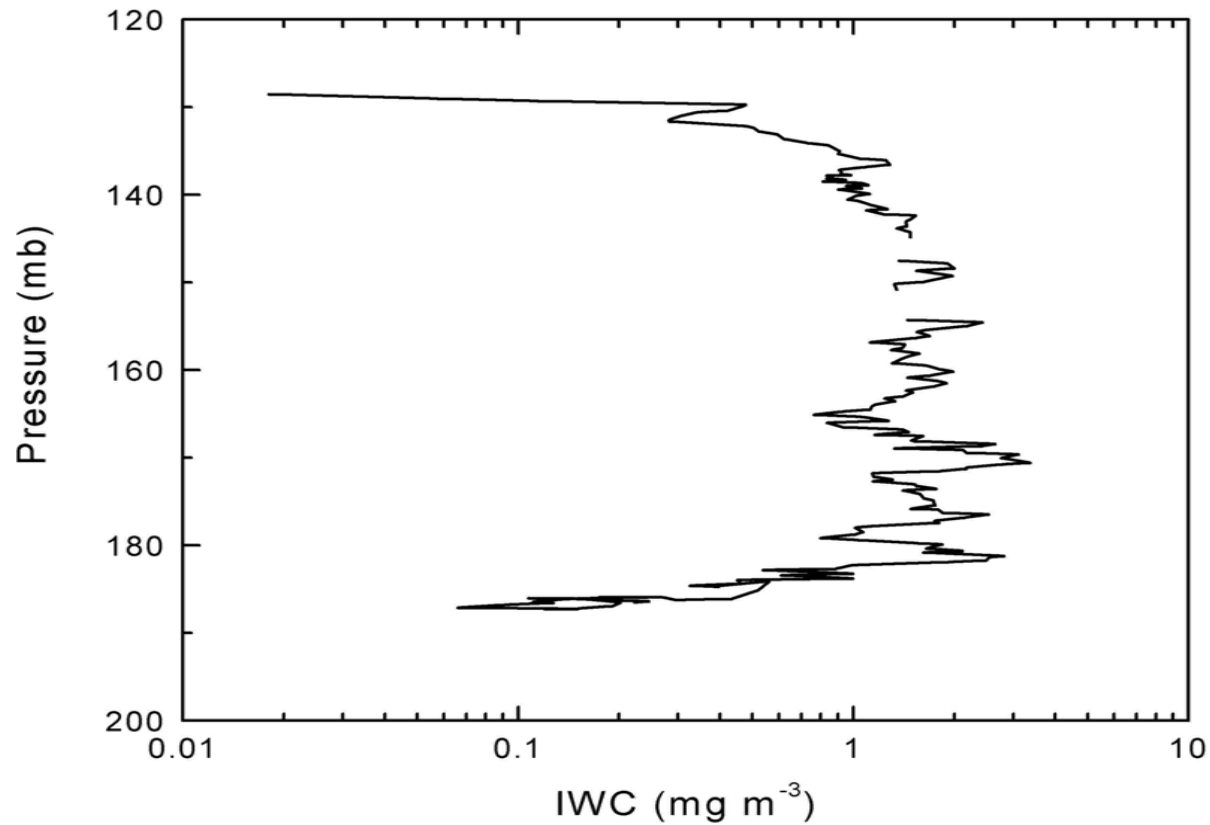
MISR overpass - 20020711



A final example



Vertical Profile of IWC



What's next?

- Additional laboratory calibrations (w/NCAR)
- Need fluid dynamical calculations to improve estimation of EF
- Analysis of differences among IWC values from various techniques (Hallar poster)